第三个版本的麦克斯韦方程组

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摘要：很多人都做过麦克斯韦方程组的拓展，会不会因为你们都做错了，所以才导致理论物理没有进展。因为这篇文章的麦克斯韦方程组的拓展，可以在现有的物理体系的正确的情况下，发现一点儿新东西。

关键词：光速，麦克斯韦方程组，虚数。

这几天，我一直在想，物理方面的"数学结构"到底从哪儿下手，才能发现新东西。因为如果物理学继续往前走，那么后来的"新物理"必然能包含"旧物理"的，然后推陈出新。按照这个思路，翻来覆去，我觉得麦克斯韦方程组可以改改，然后试了几次，终于成功了。这款改造版本就可以包含原来的版本，以及推出以前版本没有的东西。然后我发现它可以改成下面这样，两者是等价的，并且从形式上看，更美观，更有意义。

$$
\begin{cases}
\mathbf{1}, (\nabla\cdot\mathbf{E}) = \dfrac{1}{(\varepsilon_{\mathbf{o}})} * \left(\varphi_{\mathbf{B}}\right) , \\
\mathbf{2}, (\nabla\times\mathbf{E}) = -\dfrac{(\mathrm{i})}{(\varepsilon_{\mathbf{o}})(\mathrm{c})} * (\mathbf{J_E}) - \dfrac{(\mathrm{i})}{(\mathrm{c})} * \dfrac{\partial \mathbf{E}}{\partial \mathrm{t}} , \\
\mathbf{3}, (\nabla\cdot\mathbf{B}) = \dfrac{(\mathrm{i})}{(\varepsilon_{\mathbf{o}})(\mathrm{c})} * \left(\varphi_{\mathbf{B}}\right) , \\
4, (\nabla\times\mathbf{B}) = \dfrac{1}{(\varepsilon_{\mathbf{o}})(\mathrm{c})^2} * (\mathbf{J_E}) + \dfrac{1}{(\mathrm{c})^2} * \dfrac{\partial \mathbf{E}}{\partial \mathrm{t}} , \\
5, (\mathrm{i}) * (\mathbf{E}) = (\mathrm{c}) * (\mathbf{B}) ,
\end{cases}
$$

等价于，

$$
\begin{cases}
\mathbf{1}, (\nabla\cdot\mathbf{E}) = \dfrac{1}{(\varepsilon_{\mathbf{o}})} * \left(\varphi_{\mathbf{B}}\right) , \\
\mathbf{2}, (\nabla\times\mathbf{E}) = -\dfrac{1}{(\varepsilon_{\mathbf{o}})} * (\mathbf{J_B}) - \dfrac{\partial \mathbf{B}}{\partial \mathrm{t}} , \ (\mathbf{J_B}) = \dfrac{(\mathrm{i})}{(\mathrm{c})} * (\mathbf{J_E}) , \\
\mathbf{3}, (\nabla\cdot\mathbf{B}) = -\dfrac{1}{(\varepsilon_{\mathbf{o}})(\mathrm{c})^2} * \left(\varphi_{\mathbf{E}}\right) , \ \left(\varphi_{\mathbf{B}}\right) = \dfrac{(\mathrm{i})}{(\mathrm{c})} * \left(\varphi_{\mathbf{E}}\right) , \\
4, (\nabla\times\mathbf{B}) = \dfrac{1}{(\varepsilon_{\mathbf{o}})(\mathrm{c})^2} * (\mathbf{J_E}) + \dfrac{1}{(\mathrm{c})^2} * \dfrac{\partial \mathbf{E}}{\partial \mathrm{t}} , \\
5, (\mathrm{i}) * (\mathbf{E}) = (\mathrm{c}) * (\mathbf{B}) ,
\end{cases}
$$

等价于，

$$\begin{cases} \mathbf{1}, (\nabla\cdot\mathbf{E}) = \dfrac{1}{(\varepsilon_{\mathbf{o}})} * \left(\varphi_{\mathbf{B}}\right) , \\ \mathbf{2}, (\nabla\times\mathbf{E}) = -\dfrac{1}{(\varepsilon_{\mathbf{o}})} * (\mathbf{J_B}) - \dfrac{\partial\mathbf{B}}{\partial t} , \\ \mathbf{3}, (\nabla\cdot\mathbf{B}) = -(\mu_o) * \left(\varphi_{\mathbf{E}}\right) , \\ 4, (\nabla\times\mathbf{B}) = (\mu_o) * (\mathbf{J_E}) + \dfrac{1}{(c)^2} * \dfrac{\partial\mathbf{E}}{\partial t} , \\ 5, (i) * (\mathbf{E}) = (c) * (\mathbf{B}), (i) * (\mathbf{J_E}) = (c) * (\mathbf{J_B}) , (i) * \left(\varphi_{\mathbf{E}}\right) = (c) * \left(\varphi_{\mathbf{B}}\right) , \end{cases}$$

等价于，

$$\begin{cases} \mathbf{1}, (\nabla\cdot\mathbf{E}) = \dfrac{(i)}{(\varepsilon_{\mathbf{o}})(c)} * \left(\varphi_{\mathbf{E}}\right) , \\ \mathbf{2}, (\nabla\times\mathbf{E}) = -\dfrac{(i)}{(\varepsilon_{\mathbf{o}})(c)} * (\mathbf{J_E}) - \dfrac{(i)}{(c)} * \dfrac{\partial\mathbf{E}}{\partial t} , \\ \mathbf{3}, (\nabla\cdot\mathbf{B}) = \dfrac{(i)}{(\varepsilon_{\mathbf{o}})(c)} * \left(\varphi_{\mathbf{B}}\right) , \\ 4, (\nabla\times\mathbf{B}) = -\dfrac{(i)}{(\varepsilon_{\mathbf{o}})(c)} * (\mathbf{J_B}) - \dfrac{(i)}{(c)} * \dfrac{\partial B}{\partial t} , \\ 5, (i) * (\mathbf{E}) = (c) * (\mathbf{B}), (i) * (\mathbf{J_E}) = (c) * (\mathbf{J_B}) , (i) * \left(\varphi_{\mathbf{E}}\right) = (c) * \left(\varphi_{\mathbf{B}}\right) , \end{cases}$$

为了书写方便，对比，我们再写一遍“完整版本”的麦克斯韦方程组，

$$\begin{cases} 1, (\nabla\cdot\mathbf{E}) = \dfrac{1}{(\varepsilon_o)} * (\varphi_{\mathbf{B}}) , \\ 2, (\nabla\times\mathbf{E}) = -\dfrac{\partial\mathbf{B}}{\partial t} , \\ 3, (\nabla\cdot\mathbf{B}) = 0 , \\ 4, (\nabla\times\mathbf{B}) = (\mu_o) * (\mathbf{J_E}) + \dfrac{1}{(c)^2} * \dfrac{\partial\mathbf{E}}{\partial t} , \end{cases}$$

这个新版本的麦克斯韦方程组，大家可以试试看一看能否发现什么有趣的东西。

然后我们又知道，$(e_o)(c) = \dfrac{(h)}{(K_B)} = \dfrac{(h)(c)^2}{(\mu_o)} = \dfrac{(G_N)(m_e)(R_\infty)}{(K_B)} = (g_z)(G_N) = \dfrac{(e_o)^2(R_\infty)}{4\pi(\varepsilon_0)(a_0)}$ 。

那么，这些等式和新版本的麦克斯韦方程组联系在一起会发生什么呢？

同志们，物理的新世界来临了。

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The third version of Maxwell's equations

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Abstract: Many people have done the expansion of maxwell's equations, because you will not do wrong, so no progress in theoretical physics. Because of the expansion of the maxwell's equations of this article, it can be under the condition of the existing system of physical right found a bit of something new.

Key words: Lightspeed, Maxwell's equations, Purely imaginary number.

These days, I've been thinking, physical aspects of "mathematical structure" exactly where laid a hand on him, to find something new. Because if physics continue to go forward, then later will inevitably be "new physics" contains "old physics", and innovation. According to this train of thought, over and over, I think the maxwell's equations can be altered, then tried a few times and finally succeeded. This modified version can include the original version, and launch than previous versions. Then I found that it can change to be like this, the two are equivalent, and from the form to see, more beautiful, more meaningful.

$$
\begin{cases}
1, \left(\nabla\cdot\mathbf{E}\right) = \dfrac{1}{(\varepsilon_o)} * (\varphi_{\mathbf{B}}) \ , \\
2, (\nabla\times\mathbf{E}) = -\dfrac{(i)}{(\varepsilon_o)(c)} * (\mathbf{J}_{\mathbf{E}}) - \dfrac{(i)}{(c)} * \dfrac{\partial\mathbf{E}}{\partial t} \ , \\
3, \left(\nabla\cdot\mathbf{B}\right) = \dfrac{(i)}{(\varepsilon_o)(c)} * (\varphi_{\mathbf{B}}) \ , \\
4, (\nabla\times\mathbf{B}) = \dfrac{1}{(\varepsilon_o)(c)^2} * (\mathbf{J}_{\mathbf{E}}) + \dfrac{1}{(c)^2} * \dfrac{\partial\mathbf{E}}{\partial t} \ , \\
5, (i) * (\mathbf{E}) = (c) * (\mathbf{B}) \ ,
\end{cases}
$$

It is equivalent to,

$$
\begin{cases}
1, \left(\nabla\cdot\mathbf{E}\right) = \dfrac{1}{(\varepsilon_o)} * (\varphi_{\mathbf{B}}) \ , \\
2, (\nabla\times\mathbf{E}) = -\dfrac{1}{(\varepsilon_o)} * (\mathbf{J}_{\mathbf{B}}) - \dfrac{\partial\mathbf{B}}{\partial t} \ , \ (\mathbf{J}_{\mathbf{B}}) = \dfrac{(i)}{(c)} * (\mathbf{J}_{\mathbf{E}}) \ , \\
3, \left(\nabla\cdot\mathbf{B}\right) = -\dfrac{1}{(\varepsilon_o)(c)^2} * (\varphi_{\mathbf{E}}) \ , \ (\varphi_{\mathbf{B}}) = \dfrac{(i)}{(c)} * (\varphi_{\mathbf{E}}) \ , \\
4, (\nabla\times\mathbf{B}) = \dfrac{1}{(\varepsilon_o)(c)^2} * (\mathbf{J}_{\mathbf{E}}) + \dfrac{1}{(c)^2} * \dfrac{\partial\mathbf{E}}{\partial t} \ , \\
5, (i) * (\mathbf{E}) = (c) * (\mathbf{B}) \ ,
\end{cases}
$$

It is equivalent to,

$$\begin{cases} 1, \left(\nabla \cdot \mathbf{E}\right) = \frac{1}{(\varepsilon_o)} * (\varphi_{\mathbf{B}}) \ , \\ 2, (\nabla \times \mathbf{E}) = -\frac{1}{(\varepsilon_o)} * (\mathbf{J_B}) - \frac{\partial \mathbf{B}}{\partial t} \ , \\ 3, \left(\nabla \cdot \mathbf{B}\right) = -(\mu_o) * (\varphi_{\mathbf{E}}) \ , \\ 4, (\nabla \times \mathbf{B}) = (\mu_o) * (\mathbf{J_E}) + \frac{1}{(c)^2} * \frac{\partial \mathbf{E}}{\partial t} \ , \\ 5, (i) * (\mathbf{E}) = (c) * (\mathbf{B}), (i) * (\mathbf{J_E}) = (c) * (\mathbf{J_B}) \ , \ (i) * (\varphi_{\mathbf{E}}) = (c) * (\varphi_{\mathbf{B}}) \ , \end{cases}$$

It is equivalent to,

$$\begin{cases} 1, \left(\nabla \cdot \mathbf{E}\right) = \frac{(i)}{(\varepsilon_o)(c)} * (\varphi_{\mathbf{E}}) \ , \\ 2, (\nabla \times \mathbf{E}) = -\frac{(i)}{(\varepsilon_o)(c)} * (\mathbf{J_E}) - \frac{(i)}{(c)} * \frac{\partial \mathbf{E}}{\partial t} \ , \\ 3, \left(\nabla \cdot \mathbf{B}\right) = \frac{(i)}{(\varepsilon_o)(c)} * (\varphi_{\mathbf{B}}) \ , \\ 4, (\nabla \times \mathbf{B}) = -\frac{(i)}{(\varepsilon_o)(c)} * (\mathbf{J_B}) - \frac{(i)}{(c)} * \frac{\partial B}{\partial t} \ , \\ 5, (i) * (\mathbf{E}) = (c) * (\mathbf{B}), (i) * (\mathbf{J_E}) = (c) * (\mathbf{J_B}) \ , \ (i) * (\varphi_{\mathbf{E}}) = (c) * (\varphi_{\mathbf{B}}) \ , \end{cases}$$

For convenient writing and contrast, we write it again "full version" of maxwell's equations,

$$\begin{cases} 1, \left(\nabla \cdot \mathbf{E}\right) = \frac{1}{(\varepsilon_o)} * (\varphi_{\mathbf{B}}) \ , \\ 2, (\nabla \times \mathbf{E}) = -\frac{\partial \mathbf{B}}{\partial t} \ , \\ 3, \left(\nabla \cdot \mathbf{B}\right) = 0 \ , \\ 4, (\nabla \times \mathbf{B}) = (\mu_o) * (\mathbf{J_E}) + \frac{1}{(c)^2} * \frac{\partial \mathbf{E}}{\partial t} \ , \end{cases}$$

This new version of the maxwell's equations, we can try a look can you find anything interesting.

Then we know that $(e_o)(c) = \frac{(h)}{(K_B)} = \frac{(h)(c)^2}{(\mu_o)} = \frac{(G_N)(m_e)(R_\infty)}{(K_B)} = (g_z)(G_N) = \frac{(e_o)^2(R_\infty)}{4\pi(\varepsilon_0)(a_0)}$.

So, these equations and the new version of the maxwell's equations together what will happen?

Comrades, the new world of physics.

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